6 June 2014

Comment/further analysis of September 2013 Acoustic Group Noise test report carried out on behalf of the Department of Sport and resulting Department of Sport conclusions/cover letter

NB References for resident Locations as per Cooper Noise Report September 2013:

A1 – culdesac at Rocky Waterholes (wrong side of street depicted in map as EPA monitor location)
A1B - location for September testing
A1A – location of previous testing by Cooper and most affected location
B2 – Starlight Place EPA location and original Cooper monitor location until required to move by HTRAGI (was not onproperty)
B2A – Starlight Place residence location
A4B – Wattle Ridge property

Page 1

Para 2 – "baseline data ….that can be used to determine operational guidelines for compliance at the venue"
Comment: real testing with valid results - not modelling, must be carried out for all use - to determine compliance - as is required by the Approval.

Para 4 – Cooper notes correct location for testing is A1A but did not use it for this test.

Page 2
Para 3
Cooper states **"the wind that occurred during the test significantly affected the measurement results.** EPA observations as discussed with HTRAG were that wind affected EPA readings – and as Cooper states, in the case of the 500m range test wind effects cause all tests to be invalid. (what was the time of this test – what tests were compliant after that time back on the 800m range)

Para 6 – Cooper states **"the influence of wind on the measurement results is significant in that as the residential premises are removed from the range often the recorded measurement is from wind or other extraneous noise rather than the shot".**

Page 4
Para 2
Cooper arbitrarily decided to remove the required A3 location tests (required by the Approval) - despite previous noise test results by consultants consistently returning non-compliant results at this location. Cooper tested at this location only once, t**hen discarded it without consent.** This location should be reinstated and tested.

Paras 4/5 – Cooper ignored the requirement to use the "most affected location within 30m of residence" i.e. A1A and used A1B in this test (though he had used the correct location A1A previously). His explanation re the business is not correct or relevant. The "location" remains unchanged and is A1A regardless of activity and in fact A1B is closer to the business

Para 7 - Cooper did not use the most affected location according to the resident, "within 30m of the residence" A1A – (instead Cooper used A1B in September test.)

He ignores the issue of topography as if it has no impact. **The residence and front yard closest to the range is on the high side of the property** and that is where noise should be tested – not in the lower levels of the property not used by the family. Cooper did previously use A1A the correct location for the June 2012 test.

Cooper attempted to use an off property location for location B2 but was required to move his monitor to the "on property" B2 location).

It should be noted that the EPA and DoP officers located at the entrance to the B2 residence did not monitor at the "most affected location" nor at the "most affected location" for the A1 property - but they didn't have to.

Cooper discusses the previously monitored location on property A1 i.e. A1A as being chosen because of vehicle movements **– this is not accurate** - it was chosen by the resident as the most affected family use location, within 30m of the residence, (the residence is elevated on a rise on the property so that is where the monitoring occurred). Cooper, for the September test, placed his monitor in a less impacted unused by family location, on a lower level of the property closer to the "business" which he says interferes with readings and the driveway where he says car movements interfere with readings. Cooper's, "clear line of site" reference (which the location he used in September didn't actually have) infers "most affected" but A1B is neither. A1A is the correct location and it does make a difference to measurements.

Page 5

Para 1 – The location used for A1 was not the previously used correct location.

Para 2 – "nearest location" has no relevance - the requirement is "most affected" Cooper confuses the issue by implying "nearest" is "most affected" – they are not necessarily one and the same.

A1B location is not the most affected – it is in fact buffered by its low lying location and trees and does not relate to the impact at the house which is elevated. Minimal car movements by HTRAG monitoring staff and Wingecarribee Council monitor. (no business vehicle movements in September 2013) occurred.

Cooper states movements of cars occurred at A1B masking shots – his test results show **3 shots out of 300** affected in one test – test 5. He exaggerates this impact of the "extraneous car noise" – in light of many of the test sets were wind affected for more than 3 shots yet the Department of Sport still relies on them.

Page 6

Para 1 – Cooper states **"The wind results set out in Appendix E for Location A1B reveal a significant variation in the direction of the wind and the wind strength that occurred at the microphone position. The variation in wind direction dramatically affected the propagation of noise received at the residential receivers, whilst the average and the peak wind speed reveals the potential for significant masking of the measured level attributed to the shot!!...** The results are invalid and unreliable and not representative of true gun noise levels on the day.

Page 7

Para 2 - Tests 26, 27, 28 removed for 400m firing point of 800m range due to time constraints - .223 not tested at 400m range

Tests of .223 show non-compliance from various lanes at the 500m firing line so it cannot be assumed .223 will be compliant at the 400m range

Page 9

Para 3

Due to Coopers comments here it may pre-empt an attempt to remove A4B from the monitoring regime. Adverse noise impacts at A4B are dependent on wind direction and the position on the range being tested. Any consideration that this location should be removed from the test program if it is proposed to **do so is opposed and would require a modification application,** PARTICULARLY, as more ranges may come into use that are closer to this property.

Para 4 – Cooper states A1B location (which should have been monitored at A1A) is the "critical location" of the residential properties. Cooper did not test at the most affected location A1A in the September test - so results reflect a lesser impact than would have been measured. Cooper states B2A (Starlight Close residence) records lower levels, consistent with previous results. **This is not accurate** - previous results show B2A to be as loud or louder at times than the A1 Property. Residence B2A must remain in the testing program also. **NB: + Location B2A had highest reading for test 8 & 9 (there are many more examples if required from previous tests where this property is louder than A1).**

Para 5 – Testing at B2A - Cooper states ambient noise from wind in the trees dominated the environment resulting in a limited number of valid results Interestingly, shots are easily recorded after the first five tests though the already high wind increased progressively throughout the day.

Cooper states "the presence of wind affecting the measurement results during the first set of tests is evident in the table of results that leads to **some anomalies with respect to the attenuation anticipated for various controls**". i.e. unreliable results.

Para 6 – Cooper again confirms that "the presence of wind throughout the majority of testing" made analysis more difficult. (unreliable and invalid)

Page 10

Para 4

Cooper 5 shots is a limited data set.

Page 15
Para 2
Cooper states **" the testing found wind of 5m/s unsuitable for the measuring of rifle shooting in that the peak hold level measurements were controlled in many cases by the wind and not the shooting. "**

Wind on 27 September 2013 was consistently higher than 5m/s (18kph) - average wind speed on the day was 24-25kph with higher gusts

http://wind.willyweather.com.au/nsw/greater-western-sydney/hill-top.html

Average wind speed: Hill Top
KPH
25-26 September – 31.7
26- 27 September - 25.6
27 -28 September - 24.1
28-29 September - 25

All test results are unreliable and invalid as they were obtained during unsuitable wind conditions - **as stated by the Department of Sports own Noise Consultant.**

Cooper confirms in his SUMMARY OF OUTCOMES:
1. "in our opinion the variable wind occurring on the day was unsuitable to fully understand the effect of each control device."

WHY is the Department of Sport using this test ***even though*** *their own consultant says the results were rendered incomprehensible!..*

Cooper ALSO implies that the ambient noise level on the day (*because of wind*) is consistently higher than the noise level of the shots. Cooper again provides evidence the tests are unable to be relied upon due to the unsuitable weather wind effects.

Page 16

Para 2 - Appendix F1 is **Test 6.**
Showing that the wind affected all measurements at A1B – The tests are invalid and cannot be relied upon.

Para 3 - Appendix F2 – is for 500m range. **Test 14.** 500m/800m range. (A1B location) Confirms the testing is invalid and cannot be relied upon.

Para 4 – Appendix F2 – wind at A1B - Cooper again confirms the measurements are wind affected. i.e. the test cannot be relied upon**.**

Para 5 – Appendix F3 – A1B wind record up to 85db and on range up to 97dB.

Para 6 – Cooper States that "minimal and stable wind conditions" are required for testing.

Page 17 – SUMMARY OF OUTCOMES dot points

Cooper states:

1. "in our opinion the variable wind occurring on the day was unsuitable to fully understand the effect of each control device."

The Department of Sport is relying on the September test results even **thought their own consultant says the results are** unsuitable to fully understand the effect of each control device.

2. The 800m noise attenuation structure is effective.

THERE IS NO EVIDENCE TO SUPPORT THIS STATEMENT - The 800m firing line tests were all carried out with use of additional temporary acoustic barriers and with those barriers only tests 1 and 2 showed any compliance with more a non-limited data set. (**6 - 10 shots)**.

3. Shooting on the non-residential side next to a barrier gave rise to a reduction from that in the open.
This doesn't mean there is compliance – just lower noise than without the barrier.

4. If further from barrier on non-residential side noise increases.

Comment: barrier is only effective in lowering noise if shooter has it between him and residence and he is up against the barrier. i.e. shooter directly on right side of barrier - but still may not be compliant (just would lessen noise).

5. Shooting on the residential side of a barrier increased the level from that when no barrier is used i.e. it concentrated the noise. (preventing dispersion away from the residents).

6. Shooting at Height (e.g. at 500m firing line) increased the noise.

7. Extended roofs in front of the shooter reduce noise.

8. Walls on either side of the shooter under the temporary roof enclosure increased the noise.

Points 1-8 Do not indicate compliance – they are comments on +- effects of barriers

Page 19

Appendix A2 – Rocky Waterholes Road bottom picture of property

A1A location shown on the map is incorrect. The actual location used was about 30m further to the SE. in line with the front door of the house at the high point of the property i.e. the "most affected location". AB1 location was a random new location chosen by Cooper for this test only - despite Coopers monitors being located at the correct A1A on property location previously,

HTRAG review of Cooper test analysis

The only tests which resulted in a set of 6 or more measurements under 75dB are tests 17 (borderline 75), 20 & 23 on the 400m firing line. These tests are identical to tests that showed non-compliance at the same firing line for the same gun with the same acoustic wall in place previously (shipping containers). They cannot be relied upon to reopen the range. (and are invalid due to the wind on the day anyway!!)

The 800m range is therefore being reopened by the Department of Sport based on invalid wind affected limited data sets – with just 3 test firings - 28 shot measured, out of the 31 tests on the day. i.e. <10% of the test shots compliant. (Also no .223 was tested at the 400m line and previous test results by Cooper show it to be at times louder than the 308.

Page 10
Para 4 - Cooper refers to 5 measurements being a " limited set of data"

- *precedent for discarding tests with 5 or less measurements*

Cooper now only does 10 shot sets instead of up to 50 shots per gun as required by Chapter 164 as was the case with other noise testing previously for the range, (even testing carried out previously by Cooper !!).

++Refer 2002 EPA memo (discussed further in this report) re Cooper's use of limited data sets at Eurobodalla and resultant application of a penalty of +3dB for cumulative effect for multiple range use.

Table 2 Page 11
800m point of 800m range

- Precedent - Cooper states that 5/10 shots affected by wind/other factors render the test to be a "limited data set" (Page 5 para 2) (Page 10 Para 4) – Cooper states the data is unsuitable to be relied upon.
- Page 17 – Cooper states "in our opinion the variable wind occurring on the day was unsuitable to fully understand the effect of each control device." No data on the day can be relied upon and no conclusions can be drawn for recommencement of use.
- Averaging is not permitted (how many times does Cooper have to be told this?)
- Tests 1 & 2 for .308 show compliance only with use of additional temporary acoustic barriers – and in lanes 1- 4 only
- No shooting can recommence without temporary barriers and no test was compliant for lanes 5-7.
- No test of .223 is compliant without use of temporary acoustic barriers**.**

Green is the only data that can be used if invalid wind affected tests are accepted

Test No.	Firearm	Position	Level	result
1	308	Prone **– under roof between two walls LHS of barrier** Lane 2	68	**Additional Acoustic treatment was used and is required**
2	308	Prone **RHS of barrier** Lane 4	72	**Additional Acoustic treatment was used and is required**
3	308	Prone **RHS of barrier** Lane 8	80	Non compliant Additonal Acoustic treatment required
4	223	Prone – **under roof between two walls LHS of barrier** Lane 2	66 (3 shots)	Wind affected data set limited Additional Acoustic Treatment required
5	223	Prone – **RHS of barrier** Lane 4	70 (5 shots)	Wind affected data set limited Additional Acoustic Treatment required
6	223	Prone RHS of barrier Lane 8	68	Additional Acoustic treatment required Overridden by 308 (Test 3)

Table 4 Page 12
500m firing line on 800 m range –

- Precedent - Cooper states that 5/10 shots affected by wind/other factors render the test to be a "limited data set" (Page 5 para 2) (Page 10 Para 4) – Cooper states the data is unsuitable to be relied upon.
- Page 17 – Cooper states "in our opinion the variable wind occurring on the day was unsuitable to fully understand the effect of each control device." No data on the day can be relied upon and no conclusions can be drawn for recommencement of use.
- Averaging is not permitted (when will Cooper understand this?)
- No test of .223 is compliant without temporary acoustic barriers.
- Tests 8 & 9 show compliance only with use of additional acoustic barriers
- Lanes 1-3 not tested for 308.
- No compliance test for .223 for lanes 5,6,7 and lanes 1- 4 require additional acoustic barriers for compliance

NB: e.g. Location B2A was most affected location in test 8 & 9. (reason why this location must remain in the testing regime)

Test	Firearm	Position	Level	Result
7	308	Prone – **RHS of Heavy temporary acoustic wall** Lane 4	70 (5 shots) AB1	Wind affected data set limited **Acoustic Treatment used and required**
8	308	Prone **RHS of heavy temp acoustic** wall Lane 7	73 (8 shots) B2A	**Acoustic treatment used and required**
9	223	Prone **RHS of Heavy Temp Acoustic Wall** Lane 4	73(9 shots) B2A	**Acoustic treatment used and required**
10	223	Prone **RHS of Heavy Temp acoustic wall** Lane 7	77	Non Compliant Acoustic treatment required
11	308	Prone **Under temp acoustic roof LHS of temp shelter** Lane 4	76	Non compliant Acoustic treatment required
12	223	Prone **- under temporary acoustic roof LHS of temp shelter** – Lane 4	**74**	**Borderline Acoustic treatment required**
13	308	Prone Under **temp acoustic roof RHS of temp shelter** Lane 4	79	Non compliant Acoustic treatment required
14	223	Prone **– Under temp acoustic roof – RHS of temp shelter** Lane 4	78	Non compliant Acoustic treatment required

Table 6 Page 13
400m point of 800m range

- Precedent - Cooper states that 5/10 shots affected by wind/other factors render the test to be a" limited data set" (Page 5 para 2) (Page 10 Para 4) – Cooper states the data is unsuitable to be relied upon.
- Page 17 – Cooper states "in our opinion the variable wind occurring on the day was unsuitable to fully understand the effect of each control device." – No data on the day can be relied upon and no conclusions can be drawn for recommencement of any use.
- Averaging is not permitted (Cooper needs this message reinforced)
- Tests 17 (borderline), 20 and 23 show compliance for 308. BUT previous testing shows consistent non-compliance with same configuration of prone shooter, 308, and the shipping containers e.g. Test 2 & 4 June 2012 - so the September data cannot be relied upon to reopen the range and of course the wind makes all tests invalid anyway as does Coopers statements re wind effects on all tests (this wind issue can be backed up by EPA who were present).
- No compliance testing of .223 for 400m firing line has been carried out - previous tests show .223 can be louder than .308 at various locations and/or non-compliant without additional acoustic measures.
- Again B2A is louder than A1B (B2A must continue to be tested)

Test	Firearm	Position	Level	Result
15	308	Prone **RHS of Hebel wall and also RHS of temp acoustic wall** Lane 4	72 B2A	**Acoustic treatment used and required**
16	308	Prone – **RHS of Hebel wall and RHS of Heavy Temp Wall** Lane 7	76 B2A (7 shots)	**Acoustic Treatment used and required** Dispute B2A wind affect on these shots
17	308	Prone lane 1	75 (9 shots)	Borderline
18	308	Standing Lane 1	78	Non compliant
19	308	Standing on ute L 1	74	BORDERLINE
20	308	Prone lane 4	72 (10 shots)	
21	308	Standing L 4	74	BORDERLINE
22	308	Standing on ute L4	76	Non compliant
23	308	Prone lane 7	71 (9 shots)	
24	308	Standing L7	78	Non compliant
25	308	Standing on Ute L7	77	Non compliant

Table 8 Page 15
100m firing line 800m range

- Precedent - Cooper states that 5/10 shots affected by wind/other factors render the test to be a" limited data set" (Page 5 para 2) (Page 10 Para 4) – Cooper states the data is unsuitable to be relied upon.
- Page 17 – Cooper states "in our opinion the variable wind occurring on the day was unsuitable to fully understand the effect of each control device." – No data on the day can be relied upon and no conclusions can be drawn for recommencement of any use.
- Averaging is not permitted
- 22 magnum (test 31B/34) – was only tested in Lane 2, and with additional acoustic barriers, 22 magnum cannot be used before retest without additional acoustic barriers and with testing across various lanes.
- 22 magnum - limited data set 31B (3 shots)
- Big bore fail at 100m
- Additional temporary barriers/roofs were used for all tests

Test	Firearm	Position	Level	Result
29	308	Prone **RHS Heavy Temp acoustic wall Lane 2**	79	Non compliant Acoustic treatment required
30	223	Prone **RHS heavy temp acoustic wall Lane 2**	78	Non compliant Acoustic treatment required
31 (A) invalid	22 magnum	Prone **RHS heavy temporary acoustic wall Lane** 2	No valid data at A1B wind	**Acoustic Treatment required**
31 (B)	22 magnum	Prone **LHS heavy temporary Acoustic wall** lane 2	71 (3 shots)	**Limited data set Acoustic treatment used**
32	308	On **RHS of heavy acoustic wall under temporary acoustic roof** Lane 2	77	Non compliant Acoustic Treatment required
33	223	Prone **RHS of temp wall under roof Lane 2**	75 (6 shots)	**BORDERLINE Acoustic treatment used**
34	22 magnum	Prone **RHS of acoustic wall under temp roof Lane 2**	69 (6 shots)	**Acoustic treatment used**

Page 17 – SUMMARY OF OUTCOMES dot points

Cooper states:

1. **“in our opinion the variable wind occurring on the day was unsuitable to fully understand the effect of each control device.”**

The Department of Sport is relying on the September test results even thought their own consultant says the results are unsuitable to fully understand the effect of each control device.

Comment on
Department of Sport COVER LETTER newly recommenced use

COMPARED TO ACCURATE ANALYSIS OF THE SEPTEMBER TEST RESULTS.. IF THE INVALID WIND AFFECTED TESTS ARE USED.

100m firing Point

Existing targets at stop buttt

- Small bore up to 22 magnum can be used – where a side barrier wall constructed of shipping containers has been placed next to the shooter

DISAGREE

1. 22 magnum cannot be used without heavy temporary acoustic wall as used in test 31B/34 and has not been tested across the range, only in Lane 2.

Analysis by Sport

400m firing Point

Existing targets at stop buttt

- Shipping containers to be clad
- Prone position can resume from all lanes

DISAGREE

1. Only tests 17 (Borderline 75dB), 20 and 23 with 308s show compliance (unreliable limited data sets) and previously the same gun/position test has been shown to consistently fail.
2. 223's not tested and can be louder/non-compliant therefore cannot recommence use of 223 calibre until tested in reasonable weather and with sufficient suitable data.

Moveable Targets

- Prone position only
- All shots to accumulate in stop butt
- No metal targets ……..
- No firearm above 8mm NATO 7.62 round

DISAGREE

1. Only tests 17(borderline 75), 20 and 23 with 308s show possible compliance (unreliable limited data sets) and previously the exact same test consistently failed.
2. 223's were not tested but have been louder/noncompliant
3. Cannot recommence use until tests are carried out in reasonable weather resulting in sufficient data sets.
4. No permission for use of Moveable Targets (see reason below)++

500m firing Point

Existing targets at stop butt

- Prone position only
- Temporary moveable side barrier walls beside shooter.
- Three walls distributed across the firing lanes if all lanes are being used.

DISAGREE

1. No compliance test for 308 for lanes 1-3.
2. No compliance test for .223 for lanes 5,6,7 (which can be louder than 308)
3. Three walls distributed across the firing lanes has not been tested.

Moveable targets

- Prone position only
- All shots to accumulate in stop butt
- No metal targets ……..
- No firearm above 8mm NATO 7.62 round

DISAGREE

1. Lanes 1-3 not tested for 308.
2. No compliance test for .223 for lanes 5,6,7
3. Temporary moveable side barrier walls beside shooter are required as per existing target conditions.
4. Three walls distributed across the firing lanes if all lanes are being used as per existing target conditions but has not been tested.
5. No use of MTs (See below)++

800m firing Point

Existing targets at stop buttt

- Shipping containers to be clad
- Lanes 1-6 prone only
- Lane 7 – temp moveable side barrier wall adjacent to shooters (until permanent roof extension and permanent barrier).

DISAGREE

1. Lane 7 – temp moveable side barrier wall adjacent to shooters (until permanent roof extension and permanent barrier) was not tested.
2. Lane 8 was non-compliant with the barrier proposed for Lane 7 – no evidence Lane 7 would be compliant with side barrier as proposed, prior to roof extension even with barrier which has not been tested.
3. Acoustic treatment required for use of any lane (no tests were carried out without temporary acoustic walls)
4. Only lanes 2 & 4 tested for 308s were compliant and used temporary acoustic walls
5. Lanes 5-8 non compliant or untested.

800m firing point (cont'd)
Moveable targets

- Prone position only
- All shots to accumulate in stop butt
- No metal targets ……..
- No firearm above 8mm NATO 7.62 round

DISAGREE

1. Lane 7 – temp moveable side barrier wall adjacent to shooters (until permanent roof extension and permanent barrier) should have been included as is required for existing targets, and remains untested
2. Lane 8 was non-compliant with the barrier proposed for Lane 7- it cannot be assumed Lane 7 would be compliant prior to roof extension, with a barrier (which has not been tested).
3. Acoustic treatment required for use of any lane - (no tests were carried out without temporary acoustic walls.
4. Lanes 2 & 4 tested for 308s were compliant only with temporary acoustic walls
5. Lanes 5 - 8 non-compliant or untested
6. NO Use of MTs (see below)++

Comment on Moveable targets

*The 800m range only has Project Consent for use **as described in the consent** with **"targets at the stop butt".** Department of Sport now proposes (has commenced) to move Targets towards firing lines across various locations on the 800m range. Environmental impacts of this use have not been studied nor has that use been approved by the Department of Planning in the Project approval.*

This activity constitutes a breach of the project consent for use of the 800m range. There is description in the consent documents that the 800m range has "seven targets located at the stop butt".

- Any change of use to moveable targets requires a modification application with EIS for contamination effects and lead recovery and plans for contamination basins for run off of contaminated water, baseline soil testing across the range etc, as was required for the moveable target range configuration at the new 500m range which has moveable targets.

- If moveable targets are located in the "gaps" between the 100m firing lines to shoot large calibres a distance of 100m, the mound of the forward firing line becomes a "stop butt". ie. waste bullets and resultant contamination will require remediation of these "stop butts" over time.

- If moveable targets are located on the top of a forward firing mound expert evidence is that there can be no possible guarantee (as required by the NSW Firearms Registry), that the missed target shots will land in the existing stop butt. OBVIOUSLY, if such were possible, the new 500m range would not have required containment ponds to collect fall-out across the range caused by the use of moveable targets at that range.!!!

- The purpose of the stopbutt at the 800m range is to contain all bullets and contamination at the range, (already contaminated and requiring current remediation), and with moveable targets, bullets may not be stopped and may proceed past the target up to 1000m and fall anywhere on the range (and

ricochet off the targets in all directions Safety is a serious concern that needs to be addressed.

- Targets on the top of the stopbutt the level of trajectory of the bullet may miss the existing stopbutt altogether.